SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Original Correspondence.

COLLIERY WORKINGS IN DURHAM.—No. II.

PEASES' WEST COLLIERIES.

Job's Hill.—This colliery has been 15 years in operation. One pit, sunk to the Brockwell seam, 54 fms. in depth, divided by wood brattice into two parts; the larger division is for coal work, and the inlet for air, the smaller appropriated as the upcast for the exhaust steam of the underground engine; there is no furnace here. About 16,000 cubic feet of air per minute is circulated; the larger portion returns to Bowden Close, the remainder to Job's Hill upcast shaft. Lever winding-engine, 26-in. cylinder, 5-ft. stroke, 11-ft. conical drum for round wire-ropes; 300 tons of coal per day raised in cages, holding two tubs on one deck. A horizontal hauling-engine, placed 40 yards west of the pit, in line with the plane on the opposite side; has two 15-in. cylinders, 2-ft. stroke, wheels in ratio of 1 to 2, and three drums. One drum, on a separate shaft, is now only used for the south-east plane, 800 yards in length, which dips inwards 2 in. per yard; it has three branches from it towards the extremity, into each of which the tubs run by gravity with the main rope, and are drawn to the pit with the same. The other two drums are on one shaft, and are put in or out of gear by a clutch; they are intended for hauling in or out on a south plane by tail and main ropes. Four plain boilers supply the two engines; the steam-pipes for the underground engine are placed in the upcast shaft. The boilers are hand-fired, are under cover in a shed, and are fed by a Cameron 6-in. inverted cylinder, 4½ ram, 5-in. stroke.

Sunniside.—This colliery has recently been opened in the Brockwell seam; its depth is 37 fms., 4 fms. more of sump. Horizontal winding-engine; has two 16-in. cylinders, 3-ft. stroke, direct acting; 2 drums, 7½ ft. in diameter, for round wire-ropes. A brake-strap goes round each side of one drum. Horizontal pumping-engine, placed in the same building with the winding-engine, 21-in. cylinder, 3½-ft. stroke, direct acting. It raises water by one 12-in. bucket-lift, 23 fms. in height, where it runs off by an adit level in the Five-quarter seam. The engine is connected with the pump-rods by means of a shaft with two cranks, and back connecting-rod to a quadrant; two Lancashire boilers, 28 by 7 ft., 2 ft. 9 in .tubes, supply both engines, at 43 lbs. pressure, fed by Cameron's 8-in. engine, 5-in. ram, 6-in. stroke. Quantity of coal raised, 400 tons per day. The railway from this colliery to Sunniside engine, to join the Stockton and Darlington system, is the private line of the firm, and is one mile in length, rising from the colliery 1 in 36. The hauling-engine, placed at the top of the incline, has one 18-in. horizontal cylinder, 3½-ft. stroke; wheels in ratio of 1 to 3; one 4-ft. drum; fly-wheel 14 ft. diameter. The wagons run down the incline with the rope. One plain boiler, 25 by 5 ft., supplies this engine with steam at 40 lbs. pressure.

Water Houses.—This colliery has been 11 years in operation. The coal was at first raised by a pit, 24 fms. in depth, to the Brockwell seam. This is now discontinued, and the coal is raised by two drifts, one to the north and one to the south, the produce from each being brought to the same platform at the pit by one hauling-engine. This engine has two 20-in. horizontal cylinders, 4-ft. stroke; two pinions of 33 teeth, and four spur-wheels of 74 teeth; four drums, 9½ ft. in diameter, requiring strong brakes. Each drum is put in or out of gear by slide-carriages. There are two drums for each drift. The north drift is 180 yards in length, dipping 2 in. per yard; the main rope only is used for this part. The plane is extended over 200 yards beyond this, on a varying gradient, and this is worked in and out by tail and main ropes; 32 tubs are run with each journey. On the south side there are about 200 yards of gangway to the drift, then 150 yards of drift, on a dip of 5 in. per yard. These two portions are worked by the main rope only, with 30 tubs. Beyond the drift the plane extends 800 yards further, irregular gradient; 60 tubs are run in and out by the tail and main ropes. The coal from each drift is tipped into a small hopper underneath the platform, from whence it is conveyed, in its unscreened state, to supply the coke-ovens; 650 tons are raised per day from both drifts. Average thickness of Brockwell seam, 3 feet. Horizontal pumping-engine, 24-in. cylinder, 4-ft. stroke, direct acting to fly-wheel shaft. It pumps from this shaft end by a connecting-rod and counter-beam to the pit, with one 15-in. bucket-lift, 3½-ft. stroke, 24 fms. in height. This engine goes day and night, 16 strokes in summer; the maximum in winter is 22 strokes per minute. The pump-pit, 40 yards east of the coal pit, is also the return air-pit from the mine. The ventilator is a Guibal fan, 20 ft. in diameter, 10 ft. wide. The driving-engine has on 18-in. horizontal cylinder, 20-in. stroke, direct acting; it performs 44 revolutions per minute. The air-pit is made close at the top, and the air passes thence to the fan, through a culvert. Three plain boilers under cover, 34 by 6 ft., hand-fired, are fed by a Tangye's horizontal special pump, 6-in. cylinder and 3-in. ram. In conjunction with these, two Howard's safety boilers are erected over, and heated by, the flues connected to the coke-ovens. Each boiler has 128 pipes; they work satisfactorily, and will produce superheated steam at 100 lbs. pressure, if required. The steam-pipes from the whole of the boilers join at a receiver; working pressure, 42 lbs. The feed-water is heated to 212° by exhaust steam. The coke made at this colliery is conveyed away by the Dearness Valley branch of the North-Eastern system. The cottages at Waterhouses are of a very superior description, and, with open spaces and neat gardens adjoining, present a most pleasing contrast to many colliery villages.

Esh.—This colliery has been recently opened in the Brockwell seam. Two pits are sunk, 40 yards apart—one 12 ft. in diameter, as a coal pit and downcast; the other, 9 ft. in diameter, is now used as an upcast and pump shaft. The depth is 28 fms. to the seam; 4 fathoms more of sump. Horizontal winding-engine, 20-in. cylinder, 4-feet stroke, direct acting, 9½ ft. drum for round wire-ropes; two tubs in each cage on one deck. The winding-engine at first had two cylinders of the size given, but it has been divided; the other half is now used as a pumping-engine, acting direct to two quadrants placed over the back pit. The water is raised by two 15-in. bucket-lifts, 3½-ft. stroke, each 28 fms. in height, and both deliver at the surface. The engine goes day and night at 11 strokes per minute. Two Lancashire boilers, 30 by 7 ft., 2 ft. 9 in. flues, supply both engines with steam at 45 lbs. pressure. The boilers are enclosed in a shed, and fed by an 8-in. Cameron engine, 4½-in. ram, 6-in. stroke.

Wooley Colliery.—This colliery has been five years in operation. One pit, 12 ft. in diameter, is sunk to the Brockwell seam; its depth is 78 fms.; 7 fms. more of sump; the thickness of coal varies from 2 ft. 10 in. to 3 ft. 6 in. The pit is divided by wood brattice into two parts; the larger division is used for drawing coal; the smaller is an upcast, for the ventilating furnace at the bottom of it. There is underground communication with Bowdon Close Colliery from this pit. Lever winding-engine, 37 in. cylinder, 6 ft. stroke; cylindrical drum for round wire-ropes, 15 ft. 7 in. diameter; fly-wheel, 24 ft. 3 in.; the strap of foot-break acts on the under side of its circumference; 400 tons of coal raised per day. The underground hauling-engine, near the pit bottom, has one 15-in. horizontal cylinder, 2 ft. 2 in. stroke, wheels in ratio of 1 to 4; two drums on one shaft, with a clutch. This engine hauls the tubs up an inclined bank north from the pit, on a steep gradient, with a tail-rope and drum; the full ones descend by gravity with the rope. The bank on the south side of the pit, owing to faults, has a dip of about 4 inches per yard. The full tubs are drawn up this by the main rope and drum. At the bottom of this bank an endless chain road is in operation. The road dips a little inbye for 200 yards, and rises 6 in. per yard for 100 yards further. Four plain boilers—three 33 by 5 ft., and one 34 by 6 ft.—supply the two engines with steam at 35 lbs. pressure; they are covered with the composition; Juckes's revolving grates are applied to them. A vertical 8-in. engine feeds the boilers, and turns the firing apparatus. The steam-pipes for the underground engine are placed in the upcast side of the pit. Water is drawn at nights by the winding-engine in iron tanks, each holding 340 gallons; this supplies a reservoir. The water is forced by the same engine from this to other reservoirs of sufficient height for the use of the coke ovens. The arrangement of the coke oven flues and the boilers is so well contrived that smoke is scarcely perceptible from the chimneys. The small coal made at the screens is raised by an inclined elevator to the level corresponding with the coal hopper for charging at the top of the ovens, without being screened again.

Bowdon Close.—This colliery has been 26 years in operation. Two pits are sunk to the Brockwell, 60 fathoms in depth—one, the downcast and coal pit; the other, an upcast, exclusively from the furnace at the bottom of it. Beam winding-engine 28½-in. cylinder, 4-ft. stroke, 12-ft. cylindrical drum for round wire-ropes, single tub cages. Horizontal hauling engine near the bottom of the pit, has two 15-in. cylinders, 2-ft. stroke, wheels in ratio of 1 to 3; two 4-ft. drums, with slide carriages, on separate shafts. Three plain boilers supply the two engines with steam at 28 lbs. pressure; these are covered by composition, and in a shed. The underground engine-road extends half a mile east of the pit, having a rise of 1 in 6 to the east at the further end. This road is worked partly with two ropes, and partly with tail rope only. The south branch from the far end, dipping south 1 in 9, is also worked with the tail rope. The Brockwell seam averages 3 ft. 6 in. of clean coal. The output of coal is about 350 tons per day. The strata are much disturbed here by faults. The air in circulation through the mine is about 30,000 cubic feet per minute. A branch railway from this colliery of one mile joins the West Durham Railway. A horizontal engine with two 20-in. cylinders, 3-ft. stroke, four wheels of equal size, one 5-ft. drum, is required to draw empty wagons from the junction up to the pit. Two plain boilers, 35 by 5½ ft., supply steam at 30 lbs. pressure; these are also covered, as those at the pit.

General Shops, near Bank Foot.—The new work for the collieries is nearly all done at these shops. The smith's shop contains six fires, one 10-cwt. steam hammer, and punch and shears combined, the fires are blown by one of Lloyd's 18-in. noiseless fans. The fitting shop contains six machines—one planing, one slotting, one self-acting lathe, one screw-cutting lathe, one drilling, and one screwing machine. These are driven by a 15½-in. horizontal engine, making 55 strokes per minute; the fan is driven from the engine by three belts at the rate of 1600 revolutions per minute. The circular saw, in an adjoining building, is also driven by it at the rate of 800 revolutions. The two Guibal fans, with the engines in connection with them, now in operation at the Stanley and Waterhouses Collieries, were made altogether at these shops. The viewer's offices are situated near the shops, from which telegraphic communication is had with the respective pits and works.

Brick Manufactory.—Fire-bricks are made at Roddy Moor Pit, to the extent of 10,000 per day. The clay-mill is of the usual type, and is driven by an 18-in. horizontal engine, 3-ft. stroke; steam is raised in a vertical multitubular boiler. Ten kilns are built. These works have lately recommenced, after standing a considerable time. The principal brick manufactory is at Bank Foot, producing about 26,000 bricks per day; these are divided into old and new works. The old works clay-mill is used for crushing gannister, and is driven by a 40-horse beam-engine. The ground gannister is not tempered until just before it is moulded—two hand machines are used for moulding. There is one kiln for burning gannister bricks, one for lumps, and two for sanitary and other pipes. The pipes are moulded by machines. For dry furnace heat the gannister brick is, perhaps, the most refractory and lasting brick known. At the new works the clay-mill is driven by an 18-in. horizontal engine. One Lancashire boiler supplies steam for both engines. The clay-mill has two metal crushers in place of stone, each of which weighs 9 tons, and central grate in the bed-plate. There are two pug-mills, one elevator to the riddle, which is placed low; another elevator from the riddle to the pug-mills. The bricks are moulded by hand. Some intended for building purposes, are pressed by machinery, at the rate of eight per minute. There are nine kilns here, each kiln has six fires at one side; at one end they are filled with bricks, and when burnt removed at the other end, by means of trams running on rails.

The Stockton and Darlington Railway extension to Tow Law, now incorporated with the North-Eastern Railway system, passes through Bank Foot the works, by which the produce of the Pease's West Collieries is conveyed southward. The communication with Tow Law is by inclines worked by Sunniside stationary engine; and by a recent deviation for locomotives on a contour line, rising 1 in 50. The Stanley stationary engine hauls on the incline from Waterhouses, and the branches from Stanley and Wooley Collieries up to the engine, and from thence on another incline to Bank Foot.

Preparing Cements.—By the invention of Mr. R. P. Busk, Lille, France, the shale, as it is dug out of the quarries or mines where it is found (as, for instance, at Tournal), is calcined and then finely ground and sifted so as to remove from the fine powder all grit and coarse particles. This Tournal and other hydraulic cements, such as Portland cement, Roman cement, or Vassey, and others that are used for making artificial stone, and for ornamental and architectural and other purposes, may be employed, whether such cements are to be used alone or in combination with sand, chalk, clay, pounded stone, marble, or other analogous substances. The material the inventor employs for the above-mentioned purpose is a solution of silicate of soda, or of silicate of potash, or other soluble silicate, which is to be mixed in variable proportions with the water as ordinarily employed in treating cements, with the cements and other ingredients used for producing artificial stone, so as to bring these materials into such a pasty, or plastic, or semi-pasty state as to cause the particles to adhere together when submitted to pressure or when poured into moulds.

"Messrs. Vivian v. The Swansea Union."

Sir,—This appeal case has given rise to considerable correspondence in the *Mining Journal* and other papers, scarcely a week passing but remarks are made respecting what is termed the "ignominious defeat of the Assessment Committee of the Swansea Union."

I do not complain of unfair criticism on the part of any journal, but still there are some facts connected with the case that have not hitherto been ventilated, and it is only fair towards the Committee and the ratepayers of the Union at large that the saddle should be placed on the right horse respecting the actual cause of squandering so much public money in litigation, which could well be avoided.

By your permission I will state a few facts in connection with the case, as came under my personal notice, or obtained from reliable information, which I believe will tend to disprove some assertions made:—

1.—That the Union authorities are entirely to be blamed for the course adopted by them as regards the valuation, the subsequent appeals, and the incurring of so much cost in litigation; and—

2.—That the case resulted in the ignominious defeat of the Union.

1.—For some time past there appeared considerable dissatisfaction in many parts of the Union respecting the assessment of some of the works; and some time in 1867 the question was brought under the notice of the Assessment Committee, and ultimately they resolved to have a new valuation made of the principal works in the Union. One grievance complained of must be admitted here—that the Assessment Committee did not appoint a professional valuer, but they appointed a person who had their entire confidence (Mr. Llewelyn Davies), who was brought up as a mechanic, and for upwards of 10 years acted as foreman over a department in one of the principal foundries in South Wales—the Millbrook Iron Foundry, Swansea,—and for 12 years filled the office of assistant overseer for the hamlet of Clase, and performed the duties connected therewith in a most impartial manner, and they had every reason to believe that in this case he would do justice between the proprietors of works on the one hand, and the ratepayers at large on the other hand; and although he failed to perform the difficult task of pleasing every person, still the fact stares us in the face that, with the exception of the Messrs. Vivian, he actually valued all the works, without even an appeal to the Assessment Committee being made against his valuations.

The subjoined table will show the amounts of old and new assessments of the principal works in the Union, together with the amount agreed upon (a compromise), after an appeal which lasted three days:—

Mr. Davies's Valuation of the Principal Works in the Swansea Union, 1868.

—	Rateable value old assessment.	Rateable value of Davies's assessment.	Assessment agreed upon on appeal.
	£22112 10 0	£ 2216 0 0	— £1530 0 0
Mr. Lambert's Copper Works, Rolling-mill, and Foundry, } St. Thomas }	1068 10 0	1982 10 0	1296 0 0
Messrs. Vivian and Sons Hafod Copper Works, St. John's..	688 10 0	1440 0 0	910 0 0
" " Rolling-mills, Forge, &c., "	607 10 0	1415 10 0	257 10 0
" " Silver Works, &c., "	135 0 0	257 10 0	350 0 0
" " Foundry, &c., "	—	426 0 0	660 0 0
" " Phosphate Works, "	—	792 0 0	529 0 0
" " Sulphuric Acid Works, "	391 11 8	610 10 0	—
Mr. H. H. Vivian's Hafod Isha Nickel Works, "	959 0 0	1706 10 0	—
Messrs. Williams, Foster, and Co.'s Morfa Copper } Works, Rolling-mills, &c. } "	240 0 0	300 0 0	—
" " Silver Works, Hamlet of Clase..	220 0 0	279 0 0	—
" " Landore Copper Works, "	440 0 0	569 0 0	—
" " Rose Copper Works, "	807 10 0	1320 0 0	—
The Landore Tin Works, "	695 0 0	1120 0 0	—
The Ynispenllwch Tin Works, Clydach	680 0 0	924 0 0	—
The Pontardawe Tin Works, "	306 0 0	850 0 0	—
The Cwmbwrla Tin Works, Parish of Swansea	467 10 0	850 0 0	—
The Cwmfelin Tin Works, St. John's			
Total	£9838 11 8	£16,998 10 0	—

It has been stated that the valuer took some fabulous trade profits and costs of works as a basis for his valuation, but if I am rightly informed he was guided entirely by the statute 6 and 7 Will. IV., c. 96—upon an estimate of the net annual value of the several hereditaments rated thereto—that is to say, of the rent at which the same might reasonably be expected to let from year to year, free of all usual tenants' rates and taxes, and tithe commutation rent charge, if any; and deducting therefrom the probable average annual cost of the repairs, insurance, and other expenses, if any, necessary to maintain them in a state to command such rents. And it so happens that during the past few years there are two or three cases of actual lettings of copper works in close proximity to those appealed against, the tenents taking upon themselves the payments of rates and taxes, and other expenses mentioned in the above statute, but for the present I shall only deal with one—the Forest Copper Works, which consisted formerly of 41 furnaces and calciners, and was taken by the Messrs. Vivian and Sons in 1867 for 40 years, at the annual rental of 4417*l.* 10*s.*, with a clause in their lease compelling them to expend 3000*l.* in three years from commencement of term; therefore, to ascertain the true rental of these works, it must be assumed that the

sum of 3000*l.* was expended in 1½ year: the present value, therefore, would be equal to 2789*l.* This amount will require to be recouped in 38½ years.

The residue of the sum, equal to	£	25	13 2
Interest on 2789*l.*, at 5 per cent.	139	9	0
Rental, as above	441	10	0
Total	£606	12	2

Then,— $\frac{606l.\ 12s.\ 2d.}{41} = 14l.\ 5s.$ per furnace.

Thus showing that the appellants themselves paid rental at the rate of 14*l.* 5s. per furnace, while the amount charged by the assessor throughout the Union was only 12*l.* 10s. per furnace—in fact, that being the recognised fact for upwards of 20 years in the hamlet of Clase; and Messrs. Williams, Foster, and Co. regularly paid on that principle for the Landore and Rose Copper Works, and although one of their principal agents regularly attended the parish vestries, he never demurred paying the above rate per furnace, unless some of them were actually demolished. But, assuming that the valuations were excessive, I will endeavour to prove that the appellants themselves are to be blamed for the expenses in litigation.

I fully endorse one remark in the *Colliery Guardian*—"That the evil of appeals may be avoided, or, at any rate, much mitigated, by frank and friendly conference between the parties concerned; mutual explanations and concessions are much more wisely made before strife than after it." And, with that end in view, it appears that the Union valuer adopted the above reasonable course, for after completing his valuations he waited upon the proprietors of all the works (with the exception of Messrs. Vivian), and explained to them his method of valuation. Most likely the question will be asked, Why was not the same reasonable course offered to the appellants? The answer is, "It was offered, and refused by them." I remember the valuer producing to the Assessment Committee a letter signed by one of the firm, declining the proposed interview, stating that they would take every course open to them to oppose the said valuations.

The first course taken was a formal appeal to the committee, but their solicitor, a gentleman well versed in law affairs, could not, or would not, answer any question respecting the number of furnaces and calciners, capacity of rolling mills, &c., and the Committee had no other course open to them but to decline altering the assessment until further proofs were forthcoming from the appellants. The other and last course taken was the appeal to Quarter Sessions, and the Committee were anxious, even at this stage, to avoid the expense of going into Court; therefore, some time previous to the trial, I am informed, they instructed Mr. Frank James and Mr. Haynes to offer a reduction of 1100*l.*, with powers to take a few hundreds more off if a compromise could be effected; but here, again, it was answered that "a much larger reduction, not even 2000*l.*, would be accepted." However, the amount ultimately accepted was only 1400*l.* With these remarks I shall leave the public to judge whether the Committee or the Messrs. Vivian are to be blamed for the expenses incurred.

2.—That the case did not prove an ignominious defeat to the Union will be at once apparent, from the fact that the increase sustained is 2612*l.* 8s. 4d. rateable value; and if the expense incurred is apportioned over (say) 12 years, there will be an actual gain to the local rates of no less an amount than 1000*l.* per annum. The Poor rate and the Board of Health rate in the parish of St. John, where the works are situate, are 8s. in the pound annually. Here, again, I shall leave the public to decide whether the case ended in profit or loss to the ratepayers of the Swansea Union. FAIR PLAY.

Swansea, Nov. 16.

COAL-CUTTING MACHINERY.

SIR,—I certainly agree with "Collier" (whose letter appeared in the Supplement to the Journal of Nov. 5), in thinking the machine described by your correspondent in the *Mining Journal* of Oct. 29 was considerably exaggerated, and am surprised to see in last week's Journal that Mr. Hurd should say the "abilities of his machine are positively underrated, and the account a very modest one." In my opinion the possibilities set forth should be very cautiously regarded, after reading his corrected statement.

Your correspondent states "the cutters were applied to a band of *stone*, so that the coal was just cleared by the groove made by the cutters." This certainly leads anyone acquainted with coal workings to understand that the holing was being done in *stone*, just under the coal, and that the machine worked with the greatest ease, and quite steady, cutting at the rate of from 8 to 10 yards per hour; whilst Mr. Hurd states that an average of 80 yards at least could be relied upon and guaranteed. Mr. Hurd also says "not a word was said respecting the pressure of air required" to drive the machine, which he now asserts to be from 10 to 15 lbs. per inch. Neither was there a word said about the size or number of cylinders required to work the machine at the pressure he gives. If we take Mr. Hurd's corrected statement, that the saving effected over hand labour by his machine is *one-eighth*, where is the improvement your correspondent calls the attention of your readers to? I think Mr. Hurd also justifies "Collier's" views; for in the former article he asserts that coal can be raised by his machine for 8d. per ton less than by hand labour. Now, in some cases the actual getting cost on the face or bord of the coal is 1s., in some 1s. 1d., and I might venture to say in some even 11d. per ton; therefore I will say 1s., which by his former assertions will be reduced to 4d. per ton, and by his corrected account to 10½d. per ton, for he states "the saving effected by my machine over hand labour is one-eighth, and not 8d. per ton."

I know a colliery owner, not fifty miles from Leeds, who insisted on the cost price of labour for getting coal being reduced 1s. 2d. per ton by the introduction of coal-cutting machinery, and was very indignant with his underground manager when he told him it could not be done. The cost per ton being paid at the time for hand-getting was (for holing, getting down, and loading), I believe, 1s. 3d. per ton; and, of course, the only difference between hand labour and the machine is the holing. This was in 1862.

Now, as Mr. Hurd does not appear to know whether the saving effected by his machine over hand labour be two-thirds or one-eighth, which is a very wide margin, I will endeavour to explain to your readers the advantages to be obtained by the machine over hand labour. So far as the question of labour goes, the improved quality of coal is self-evident. The machine, with its attendants, who are generally one man and one boy, can do the work of ten men (that is the holing), providing it can be kept constantly at work, whether the holing be hard or soft, end or face. In some seams of coal 5 yards is sufficient for one man's day's work, while in other seams a man will be able to hole 8 or 9 yards per day, and the quantity of work done by the machine will be in the same proportion, according to the hardness of the seam; therefore, the price per lenial yard varies from 16s. to 11s. for 3 ft. 3 in. deep, which depth is necessary to enable a yard to be got off. In a seam of coal giving 1 ton per square yard the difference in price between the machine and hand labour will be about 5d. per yard, or 5d. per ton. In a seam of coal giving 1¼ ton per square yard the difference will still be 5d. per yard, but only 3¾d. per ton. Taking all the little incidental occurrences into account connected with the machine, it is evident that the machine is of greater advantage in the working of a thin seam than a thick one; and thin seams might be worked to advantage by the machine that would not pay if worked by hand labour only. These remarks refer to the pick machine.

As to the capabilities of Mr. Hurd's machine I cannot say much; but with regard to its formation I see but little novelty, as a machine very like his was patented by a Mr. Peace, in 1853, for the same purpose, which he describes thus:—"I claim the combination of a movable lever and wheels, with an endless chain, band or strap, furnished with suitable cutters, the whole being mounted on an convenient frame, and receiving motion in any convenient manne for the purpose of hewing, cutting, or excavating coal and other minerals." In 1868, No. 1219, combined with my machine for the removal of the debris, I patented an endless pitch chain, carrying a series of scrapers round two chain-pulleys, projecting inside the groove, the pulleys working on a stud-pin, bolted to rings fitting loosely round the cylinders. If required, the pulleys may have spur-teeth formed thereon, gearing into corresponding teeth inside the links of the endless chain, in order to prevent any slip.

Rotatory motion is imparted to the pulleys, either by a small cylinder for that purpose on by gearing. Although it is not absolutely described for *getting* coal, still the contrivance itself is disclosed for the removal of the debris from a previously-made cut; therefore, on those grounds I consider Mr. Hurd's claim to the arrangement of endless chain carrying scrapers, which he thinks proper to call cutters, is not good. J. ROTHERY.

Leeds, Nov. 16.

BEST FUEL FOR THE NAVY.

SIR,—I read with much interest the letter on "The Best Fuel for the Navy," signed "A Welshman," which appeared in the Supplement to last week's Journal; and would much like to correspond with the writer on the subject, if he will favour me with the means of doing so, by appending his name and address to a future communication, or by addressing a private letter to your office for me. P. M.

London, Nov. 15.

IMPROVED COMMUNICATION BETWEEN THE SOUTH WALES COAL FIELD AND WEST OF ENGLAND.

SIR,—I should feel obliged if you would kindly give me a small space in your valuable Journal to make a few remarks in reference to this scheme (Canal). The object aimed at is a more easy access to the South Wales coal field from the English Channel, to avoid the rounding of Land's End. It has occurred to my mind for some months past that the same object may be attained in another way, and with infinitely less cost; it may also serve the purposes of a second scheme at the same time—the crossing of the Severn above Chepstow. The way I have thought the two objects may be attained is this:—To form a company to construct large steam-barges, to convey (say) 50 to 60 trucks each from the low-water Bute pier at Cardiff to the low-water pier at the mouth of the Avon, so that whole trains of coal could be conveyed across the Bristol Channel in the trucks it is put in at the collieries. These trucks could then either load ships in the Bristol Docks, or go on over the Great Western system to London (the shortest route from Cardiff); or, through to the Southampton Docks or Portsmouth Docks, or the other ports on the English Channel. These steam-barges could also supply another convenience—the largest iron-clads of England, or any other nation, could then be loaded from these steam-barges direct from the trucks in the Penarth Roads, thereby saving a considerable carriage to Pembroke and other large harbours, where such ships are usually obliged to go in to load.

Such conveyances across the channel would, as it appears to me, obviate any necessity for a short route to London, *via* a new crossing of the Severn, and supply a route as short, or shorter. It would also obviate the making, at an enormous cost, of a ship canal from the mouth of the Parrot, and enable the coal to be conveyed in the colliery wagons to the docks on the English Channel. As the railways on each side of the Bristol Channel would accommodate this trade, the expenditure to establish the new route could not be large.

Nov. 14. ENGINEER.

THE PROPOSED GREAT WESTERN MARITIME SHIP CANAL.

SIR,—Being associated with Mr. Owen in the promotion of the above enterprise, now so well known, our attention has been called to the letter of "G. B." (a Tivertonian), which appeared in the Supplement to last week's Journal, and we shall be glad if you will allow us to make some remarks in reference thereto.

Notwithstanding Mr. Owen's explanations in your columns, and your able comments upon the project, your correspondent does not yet seem to be aware that the proposition is to construct a maritime canal of proportions nearly as great as those of the Suez Canal, the object being to afford a water transit for the largest screw colliers (some of which have a depth of 17 ft. in the hold), and also for the Irish and Liverpool steamers, and the ships of large tonnage engaged in the corn and timber trades of Gloucester, Bristol, and the other Severn ports. The barge navigation from Bridgewater to Tiverton is, therefore, not adapted (from the smallness of its dimensions) for the purposes sought. It is, however, proposed to adopt the same course as far as possible that will, probably, be found the most practically level route. The present bridges are inapplicable, as the new waterway would have to be spanned by swing bridges to allow the passage of full-rigged vessels.

Tiverton, in which your correspondent is interested, will, no doubt, be greatly benefited by the improved communication, but it is not the intention to take the canal to that town, as that would cause too great a divergence from the suggested line, which will connect, as directly as the nature of the country may permit, the English and Bristol Channels; and, if the canal were made to Tiverton, its length would be very much increased, without obtaining any commensurate advantage. Of course, in a work of this magnitude, involving, as it does, so many considerations, much time and labour will necessarily be required in arranging the preliminaries, prior to placing the scheme before Parliament; and it will not be possible to prepare it sufficiently for the ensuing session, but it is hoped that the sessions of 1871-2 will witness the introduction of a well-matured, comprehensive project, recommended in such a manner as to ensure its success, and we shall be happy to co-operate with your correspondent, or any gentleman resident in the district, with the view of consulting the local interests, and enlisting their support. FULLER and FULLER,

25, *Bucklesbury, London, Nov.* 16. Surveyors.

MINING PROSPECTS.

SIR,—There is a great deal of despondency, and much croaking, in connection with the mining interest; and it is an imperative duty to dispel all disheartening and disquieting influences where no ground, or little ground, for them exist. On the whole, considering the time of year, and the quality of public affairs abroad, there is reasonable hope in present circumstances for a better development of mining enterprise. Of course, the prosperity of the miner—and we rank all investors in mines under that name—depends not upon the market quotations for shares, but upon the actual business transacted in metals. The share market may be rigged, may be affected by groundless panic; may be tossed up on the horns of the Bulls, or squeezed down by the hug of the Bears; but if there be a good business done in metals there will be, of necessity, a demand for the products of the mines. Are there now reasonable grounds for believing that the metal trade is looking upward, and likely to do so hereafter? I venture upon an affirmative answer to those questions. If not only the sale of metals is immediately enlarged, but general commerce is improving, the prospect is one of assurance. A large general trade cannot be done without metals being enhanced in demand and value.

There is a very general impression that the war has for a long time irreparably damaged the mining interest. This is an exaggeration. In some respects it must have done so, by its general effects upon so large on area of Western and Central Europe, but in other respects it has quickened the demand for metals when causing dulness in other directions. But in various directions besides metals the war has caused activity, and if so any depression complained of would have existed if the war had not happened.

That the war has in various directions enlivened trade has received recently a remarkable confirmation. At the meeting of the Manchester Chamber of Commerce, the greatest commercial body in the kingdom, the President boldly declared the fact. He said that the railway stations, and the warehouses and stores connected with them, were gorged with goods, which the railway accommodation, large as it was, was inadequate to take away! Now, every one knows that before the war broke out the Manchester railways could carry away the goods sent to them from the manufacturers and merchants easily enough: there was no gorging of railway stores then from incapacity to send them off. It is generally supposed that Manchester is a mere centre of cotton cloth and yarn fabrications; and persons will ask how can the war have hastened the sale of plain, twelled, and printed calicos, or cotton twist? Manchester has a large business in stuffs, wool, hats, caps, boots and shoes, tailoring, slops, and made shirts of every description. It is also the centre of a great business in manufactures made from metals—pins, files, steam-engines, locomotives, workmen's tools, railway gear of all kinds, fire-arms, especially large guns, &c. In other parts of the country connected with it business of this latter nature is transacted. Warrington makes files, which are underselling those of Sheffield. Liverpool manufactures fire-arms, iron ships, iron plates, copper sheathing, chains, cables, &c. Furness is a hive of iron manufacture, and the centre of a vast coal and iron field. The coal mines of Lancashire are famous, and although these are not metallic they are mineral, as they are now immensely active. Now, if the war has really promoted the consumption of iron, steel, lead, brass, zinc, and coal, it will not be wondered at that the President of the Manchester Chamber of Commerce should describe the great capital and thoroughfare of the county of Lancashire in the way quoted.

Leeds, Nottingham, Leicester, Bradford, Halifax, Huddersfield, &c., are all busier than they were before the war began.

Let the state of the metal and metal manufacture trades be considered directly, and favourable inferences must also be made. We learn from Truro that the smelters have made another very important advance in the tin standard—namely, 2*l.* on common and superior common, 3*l.* on fine and 4*l.* on superior fine. So that prices now range—Common, 120*l.*; superior ditto, 121*l.*; fine, 123*l.*; superior ditto, 135*l.* Good ore has advanced 5*l.* 10s. since the end of July, but is a little lower in value than when sent down by the panic about the war, from misapprehension of the extent and character of its effects on our commerce, and especially on our metal markets. The best quality of our tinstuff will now realise 80*l.* to 81*l.* per ton. Besides, there is a very active and improving demand in the Cornish market for mineral stocks in tin, lead, silver-lead, and copper mines.

Although on Wednesday the meeting of ironmaster at Wolverhampton hardly justified the extremely sanguine feeling with which they assembled, there was a good business done, in spite of considerable croaking about the war. Foundry iron, it was reported, sells well; forge iron is very firm in price, and active. The iron works generally are doing five turns a week, and the business done on Wednesday at Wolverhampton sustains the expectation that that, at all events, will continue to be the proportion of employment.

Lead and zinc are well in request, and as a consequence firm, the former sustaining its especially steady value in the market. When the war is over both France and Germany will have to recruit their stocks of iron, steel, and lead which the war will exhaust; and, of course, the expenditure of copper, brass, and tin, in camps, canteens, and garrisons, although not so great, is also considerable.

There is much more expense in working the Straits tin mines than was formerly the case: as the mines become deeper, and as no new discoveries come forth abroad, the competition with British tin will be less and less. It is believed that there is tin in India, some in the south of the United States of America, and in Paraguay, the interior State of South America, but with a good outlet by the Paraguay and Parana rivers into La Plata. It is not improbable that it may be found also in Brazil. But the day is far distant when the competition with British tin of the tin produce of other parts of the world will be too formidable.

It must never be forgotten that the more prolific the production of metals is the more will they be consumed. This is an œconomic law, too well ascertained to need proof. Where the tin, lead, silver-lead, and copper resources of Cornwall and Devon, and the lead and silver-lead deposits of South Wales, all brought to light, it would stimulate consumption, enlarge commerce, enrich the country, and be a blessing to mankind. THOMAS SPARGO.

Gresham House, Old Broad-street, City.

GOLD MINING IN WALES.

SIR,—I observe in the Journal of Oct. 29 some remarks on the Cwmhesian Mines. I quite concur with "Spectator" that the gold deposits of Wales have never been thoroughly tested or worked on sound mining principles. Having been manager of Cwmhesian for some time, and paid considerable attention to the many lodes and their junctions, I am well prepared to offer an opinion on the mines.

The Cwmhesian Mines have been scratched over by several companies, but nothing of what we call mining has been attempted. During the last working of it Mr. Moshiemer, as usual, ordered a large amount of machinery and a good deal of it was quite useless. During the time I was there we finished the turbine, erected for the purpose of draining the workings on the lead lode; the latter presented a very promising appearance, but nothing has been done to test the value of the lode. I may remark that by the time the machinery was erected the funds were exhausted, and the company were not inclined to advance more cash.

Cwmhesian, like many other mines, has suffered from an abundance of machinery, or, in other words, the cash that ought to have been spent or applied in working the different lodes in practical work was wasted in purchasing useless machinery. As far as I remember, Berdan's machines were the first erected, then came Mr. Mitchel's, these were followed by Moshiemer's, and the small pans, as used in Germany, I believe, commonly called the Hungarian pans.

Having seen a good deal of amalgamating machinery in Australia and California, I look on all the above machines as being entirely useless. By concentrating the pulverised ore, Moshiemer's might be used to some advantage. As your correspondent remarks, there are a great number of strong lodes at the East Mine, containing iron, lead, and blende. We selected some blende for shipment, and I found some remarkably rich specimens; the gold was ramified through the quartz and blende, like fine wire, and by continuing the search a number of valuable specimens were found; and, as far as I am aware, I was the only person that succeeded during the last working of the mine in finding specimens of gold from the old heaps of quartz and blende on the mines.

As stated above, I have examined the lodes very carefully, and I am fully convinced that it is a good property. A permanent shaft should be sunk at a convenient point, and the different lodes opened out in a practical manner. After the ores have been pulverised and passed through the amalgamating machinery, they should then pass on to self-acting dressing machinery, for separating the silver-lead and blende. These works carried out with care and economy, I am fully persuaded that Cwmhesian would prove to be a valuable property. I am glad to see that the company adjoining the Cwmhesian are likely to be well paid for their outlay. I examined the Gwynfynydd on several occasions, and found a splendid specimen of gold and quartz in an old hedge, some distance from where the lode was opened and showed such quantities of visible gold. WM. HOSKIN.

Sulphur Mines, Norrtelje, Sweden, Nov.

GREAT WEST CHIVERTON MINE COMPANY (LIMITED).

SIR,—The report which you inserted in last week's Journal on the proceedings of the last general meeting of the above company requires the explanation that the vendors of the mine have not agreed to the request by the directors to surrender any part of their purchase consideration *unconditionally*, but they stipulate, among other things, that such portion thereof as may be found necessary shall be applied by the directors for the purpose of raising ample capital for purchasing and erecting, with as little delay as possible, all the machinery which the mine is now fully proved to merit. HENRY VON USTER.

10, *The Green, Hampstead, N.W.* ——

EAST WHEAL LOVELL.

SIR,—Inasmuch as "A Bear" is one who thinks it no dishonour to dispose of that which he does not possess, and subsequently to do all in his power to further disparage the value of other people's property by misrepresentation, it becomes a question whether "One Behind the Scenes" is, as a matter of self-respect, altogether justified in holding converse with such a creature, even though it be through the medium of your columns; and "One Behind the Scenes" would not now so far forget his duty to himself had not "A Bear" (whose letter appeared in last week's Journal) so utterly misstated facts, and started such untenable theories, the baselessness of which is known far better to your correspondent than it can possibly be to anyone else.

As though "A Bear" was to be defeated by his own weapons, the official weekly report which appeared last week completely, conclusively, and satisfactorily answered all that appeared, even to "A Bear," necessary to induce him "to close his shares," as he terms it. That a holder—although not a larger holder—did sell *some* shares is perfectly true, but that he sold them upon the report of "his mineral agent" is not true, for the providential element, in the eyes of "A Bear," was brought about by the cajolings of a brother ursine. Moreover, it may not be altogether encouraging to "A Bear"—who has not "closed his shares"—to know that the mine, and also the market price of the shares, which is of far more serious importance to "A Bear," continues to improve "at (as you very properly stated last week) the most material point of operation—the bottom of the mine."

"A Bear" enquires of "One Behind the Scenes" whether he can say that the lode said to be worth 1000*l.* still maintains that value; because, says "A Bear," if he can do this, let him induce Capt. Quentrall to say so in his report. It is a significant fact that all this information, and much more, is furnished in another column of the same paper in which the lucubrations of "A Bear" appear. Capt. Quentrall does not stay to be "induced" to afford the important and satisfactory information required, but volunteers the fact that "*independently of*

the bottom of the mine, where the lode east is worth 250*l.* east, and west 100*l.* per fathom, there is the rich course of tin *standing east and at above the* 80, and which has been so often valued at from 800*l.* to 1000*l.* per fathom." Capt. Quentrall also replies to another query put forward by "A Bear" when he says that he "declines to reply to other people's reports, but shall report fully at the general meeting."

If this be not enough to discomfit "A Bear," and to induce him to "see the error of his ways" there is no longer any hope for the dissipation of his wonted obduracy, and, therefore, must be left to pursue his obtuse course to its better end, which means "the closing" of his shares at probably 40*l.*

Helston, Nov. 15. ONE BEHIND THE SCENES.

EAST LOVELL—"BEARS" AND "BULLS."

SIR,—Often has it been asked by shareholders in this and other mines the meaning of the term "Bears" and "Bulls," which always and unnecessarily appears in your valued Journal when the mining clique get into gambling transactions. The only practical illustration I can give is that the term does not apply to the beast tribe, but that of the human "bears" and "bulls." The former are not only recognisable by their selling propensities of what they do not possess, but by the formation of their heads, and generally turned up snouts, clearly demonstrating that they possess no straight *tip*, and are given to "lying" in all manner of ways. The latter are more of the confiding class, believing their actions in lying will further the interest of one and all, supported in this mine by the trustworthiness and safe guidance of the agent, and not by the guidance of an untruly "bear," who *himself* cannot last for ever.

A PHRENOLOGIST.

MINING SPECULATION—THE COST-BOOK SYSTEM.

SIR,—In the interest of the mining public, and in the hope that this letter may be of service in inducing an enquiry into one of the great evils of mining speculation, I trust that you will publish it, and lend your valuable aid, in proposing a remedy for liabilities which may, and often do, accrue from a venture in some mining enterprise which bids fair to be remunerative. I allude to such a case as the following. Shares are purchased in a mine founded on the Cost-Book System, having apparently a respectable management, in a good situation, and with everything to lead you to expect that the venture will be a profitable one. At any rate, you have your periodical meetings, with their report, and a sheet containing the assets and liabilities of the concern. If the expenses are greater than the profits you expect to pay your calls towards the payment of the working, and if the calls are greater than you feel inclined to incur you sell or relinquish your shares. Your confidence in the mine may be of such a kind that you willingly pay the calls, until from shortness of ore the mine is closed. You now hope that by payment of a last call your connection with the concern will cease. This, I am sorry for the interest of mining adventure, is not the case. The mine is taken into the Stannaries Court, and you probably hear nothing about it for two or three years, when, to your surprise, vexation, and possibly great inconvenience, you find that after a large number of shareholders have left those who can be found are obliged to pay a heavy call.

I will direct your attention to, perhaps, one of the grosest cases that I have heard of. I allude to the Wendron Consols. This mine was considered to be a most flourishing tin mine, and although at last the calls became very heavy, it was thought that it would eventually become profitable. It was, however, wound-up, and, according to the last statement, it appeared that all liabilities connected with it were paid. To my surprise, after the mine has been closed two or three years, notice is sent to the shareholders that a call of 14*l.* 5*s.* will be made upon each share by the Stannaries Court.

Now, I will ask, is this a system to encourage mining investment? Is it at all likely that persons will incur such a heavy responsibility? After such a flagrant case as the one given, how can anyone feel safe but that at any moment a mine in which he may have a large number of shares may not close, and that at some future time he may have to pay heavy expenses?

I would apologise for the length of this letter, but I am sure that the importance of the question will justify it. From being myself a great advocate of this branch of industry as an investment, I have determined to sell all my interest in mines, and never again to venture in them until I clearly know the amount of my liability.

A CONSTANT READER.

[For remainder of Original Correspondence see to-day's Journal.]

METALS—THEIR PROPERTIES AND TREATMENT.

The second volume of Messrs. Longmans' Text-Books of Science, edited by Prof. GOODEVE, has just been issued, and treats of a subject in which a large number of the readers of the *Mining Journal* are deeply interested—Metals: Their Properties and Treatment.* The treatise embraces the whole of what may be termed the commercial metals—iron and steel, copper, tin, zinc, lead, silver, gold, mercury, platinum, palladium, antimony, bismuth, aluminium, magnesium, and cadmium—and Prof. Bloxam considers them from the time of their occurrence as ores until they pass into the hands of the turner or fitter, so that the book is well calculated to meet the requirements of the class for which it is intended. Each metal and process is described clearly though briefly, and those who have carefully studied the book may rest satisfied with the excellent outline of the subject they will have obtained, or may pursue their further studies in any particular branch of metallurgy in which they may be engaged with equal pleasure and advantage.

To iron the author gives the first place, observing that as it is by far the strongest, and at the same time one of the lightest, its applications in the arts of construction are much more numerous than those of any other metal. Being capable of assuming, according to the treatment which it undergoes, the forms of wrought-iron, cast-iron, and steel, it is susceptible of the widest variations in its characters. Extracted from its ores in the form of cast-iron, it is melted with comparative facility, and according to the mode of operating in the foundry may be made to yield castings which are easily filed and turned, or may be rendered so hard that no tool is able to touch it. By judicious treatment with heat and atmospheric air the cast-iron is converted into steel, the strongest and one of the hardest and most elastic of all materials, as well as the only one of which a magnetic needle can be made. Continued a little further, the joint action of heat and atmospheric air converts the steel into wrought-iron, possessing great strength and toughness, yet soft enough to be turned, bored, and punched with ease, and especially when heated to be rolled and twisted into the most varied forms without cracking. With less disposition to melt under the action of heat than any other common metal, wrought-iron is sufficiently softened at a bright red-heat to be welded or joined to another piece in the most perfect manner without the use of solder of any kind. Being capable of acquiring and of losing the properties of a magnet with great rapidity, soft iron (wrought-iron) is the only material which is adapted for the construction of electro-magnetic and magneto-electric apparatus. It is not too much to assert that scarcely a step of importance has ever been made in the industrial progress of any community to which some one of the three modifications of iron has not been indispensable. Possessed of so many valuable qualities, iron is still the cheapest of all the metals, since the ores from which it is extracted are scattered in profusion through the crust of the earth, and can be made to yield the metal in abundance by a moderate expenditure of time, labour, and fuel.

The various ores of iron are next described, and then the extraction of the metal. In dealing with this part of the subject, Prof. Bloxam is particularly careful to explain the nature of the changes that take place. Thus the chief chemical operations going on in the blast-furnace he describes to be—combination of oxygen from the air with carbon from the fuel to form carbonic acid; conversion of carbonic acid into carbonic oxide, by giving up half its oxygen to red-hot carbon; conversion of oxide of iron into metallic iron, by parting with its oxygen to heated carbonic oxide; combination of metallic iron with carbon, to form cast-iron; and combination of lime with clay (silica and alumina), to form a glass or slag. The several modes of utilising the waste gas from blast-furnaces are explained, and diagrams are given which will permit of a fair opinion being formed of their relative merits. Referring to the utilisation of slag, he remarks that some attempts have been made to turn the slag to account by employing it as a manure for soils deficient in potash, of which it often contains nearly 1-50th of its weight in a form that would easily be rendered available for plants by the combined action of air and moisture. When the slag is run into water, or blown into a frothy condition by the blast, it resembles pumice stone, and is easily ground to a powder fit for applying to the soil. Cast-iron, he says, might appropriately be designated an alloy of iron with carbon, but for the circumstance that the term alloy is conventionally restricted to the substances formed by the alliance of metals with each other, whilst carbon is a non-metallic body. The several qualities of cast-iron are referred to, and the processes for the conversion of cast-iron into wrought or bar iron explained, as well as the newer processes of Bessemer, Heaton, Siemens, and others for converting crude iron into merchantable forms, the principles involved being in each case carefully discussed.

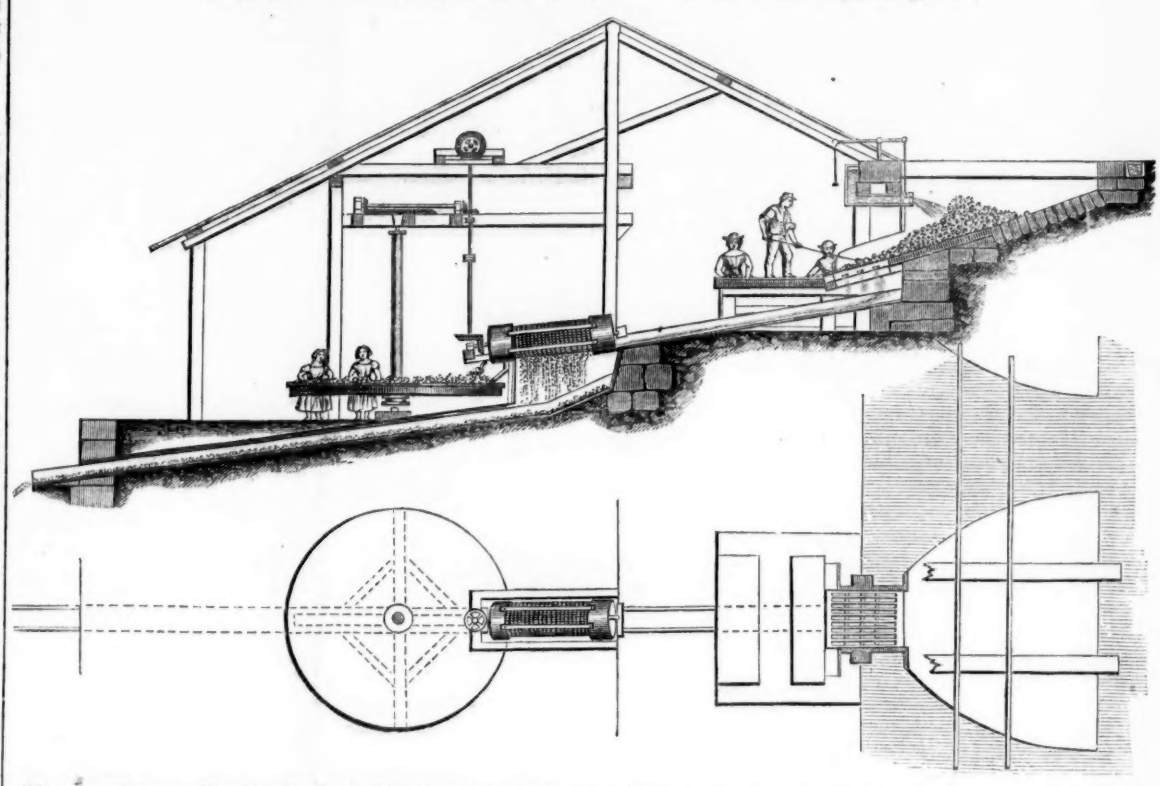
Copper, he observes, is of much more frequent occurrence in the pure metallic state, and some of the ores of copper can be much more easily made to yield their metal in a malleable condition. A very remarkable form of native copper is the copper sand, or copper barilla, of Chili, which consists of grains of metallic copper, mixed with quartz. Referring to the extraction of copper from its ores, it is said that probably no other metallurgic operation presents such an appearance of complexity as the smelting of copper ores, but this is due to the great variety of the ores to be treated, which necessitates their introduction at different stages of the process. Thus a smelting process adapted for copper pyrites must contain provisions for the removal of arsenic and sulphur, which are not present in the carbonates and the oxides of copper, so that the processes of smelting are arranged in such a manner that these ores, as well as the slags obtained in some of the operations, can be introduced after the sulphur and arsenic have been expelled. A general outline of the several processes is then given, after which the various descriptions of commercial copper are referred to. The foreign matters which commercial copper is liable to contain are arsenic, sulphur, antimony, tin, bismuth, lead, silver, iron, and nickel. Of these, sulphur and antimony are generally considered the most injurious in diminishing the malleability and tenacity of the metal. Arsenic is very commonly found in copper, amounting in some of the Spanish coppers to as much as one part in a thousand, and was formerly supposed to be as injurious to the quality of the copper as antimony is, but modern experience has shown that copper may be easily rolled and drawn into wire, even when it contains a considerable proportion of arsenic. A small proportion of tin is believed to increase the toughness of copper, but bismuth and nickel have the opposite effect.

The chapters devoted to tin, lead, zinc, and silver are treated in an equally concise yet careful manner, and much information is introduced which will be read with interest by those who have no intention of subsequently making metallurgy their special study; though that information is not the less useful to the metallurgical student proper. Of this kind is the reference to plated articles under silver. Plated articles are made of an alloy of copper and brass, coated with silver. The brass having been melted with the requisite proportion of copper in a black-lead crucible, is cast into bars 3 in. broad, 1½ in. thick, and 18 or 20 in. long. The two faces of the bar are carefully smoothed with a file, and a plate of silver, 1-25th inch thick, is laid upon each face, and tied with iron wire. A little saturated solution of borax is allowed to run in round the edges, in order that this salt may melt and dissolve the oxide off the brass when heated in the furnace. The bar is now laid upon a coke fire, and heated until the surfaces of brass and silver have contracted a firm adhesion, when the compound bar is ready for the rolling mill. After rolling it is cleaned with diluted sulphuric acid. Sometimes the clean copper surface is washed over with a solution of nitrate of silver before applying the plate of silver. A thin film of silver would then be chemically deposited upon the surface of the copper, and would both prevent oxidation and favour the adhesion of the silver plate. The plated wire used for making toast racks, &c., is made of copper, coated with silver. The strip of silver is bent round into the form of a hollow cylinder, its edges somewhat overlapping; a red-hot cylinder of copper is thrust into this, and the edges of the silver are joined together by rubbing with a steel burnisher. The copper core is then withdrawn, the tube of silver thoroughly cleaned inside, and slipped upon a bright copper rod so as to fit closely, leaving the ends of the copper somewhat projecting. Grooves are made in these ends, into which the silver is forced down so as to exclude the air from the copper surface inside. The cylinder is made red hot, well rubbed with a steel burnisher until the silver thoroughly adheres to the copper, and then drawn into wire.

The remaining chapters on gold, mercury, platinum, aluminium, magnesium, &c., are quite as interesting and useful as those referring to the commoner metals, and the book, as a whole, certainly appears to us to be one of the best educational treatises on metallurgy published. The style is concise, and technicalities when introduced are sufficiently explained to be readily understood by the general reader, yet there is no lack of completeness, nor is anything stated that would not be of undoubted value to the metallurgical student; a better treatise of the kind could scarcely be desired.

* "Metals: Their Properties and Treatment." By CHARLES L. BLOXAM: Professor of Practical Chemistry in King's College, London, &c. &c. London: Longmans, Green, and Co., Paternoster-row.

ORE DRESSING MACHINERY.



The economic preparation of ore for the smelting-furnace is a subject of considerable importance, since it embraces questions of cost of enrichment, loss of ore in dressing, and cost and metallic loss in furnace treatment. Ore-dressing machinery can only effect the mechanical separation of particles from each other, the success of which must depend on a free liberation of the grains, and sizing them in proportion as they are related to each other, both in volume and density. If bodies of various sizes, forms, and densities be allowed to fall into a liquid in a state of repose the amount of resistance which they experience will be very unequal—consequently, they will not arrive at the bottom of the liquid at the same time. This necessarily produces a sort of classification of the fragments, which becomes apparent on examining the order in which they have been deposited. If it be supposed that substances have similar forms and dimensions, and differ from each other in specific weight only, and it is allowed that the resistance which a body will experience in moving through a liquid medium depends entirely on its form and the extent of its surface, and in no way on its density—it follows that all substances will lose under similar circumstances an equal amount of their moving force, This loss is, however, most sensible in substances which possess this power of movement in a less degree—or, in other words, it will be proportionately greater in light bodies than in those having a more considerable density. The former, for this reason, fall through the liquid with less rapidity than the heavier fragments, and must, consequently, arrive last at the bottom, so that the deposit will be composed of different strata, arranged in direct relation to their various densities, the heaviest being at the bottom and the lightest at the top of the series.

Supposing, on the contrary, that all bodies falling through water have similar forms and equal specific gravities, and differ from each other only in point of volume, it is evident that the rapidity of motion will be in proportion to their size, and the larger fragments will be deposited in the bottom of the vessel. As we have supposed, on starting, bodies to have the same forms and densities, it follows that the resistances they experience during their descent through water will be in proportion to the surface exposed, and as the volume of bodies varies according to the cube of their corresponding dimensions and the surface with the squares of the same measurement, it follows that the force of movement animating them is regulated by their cubes, whilst their resistance is in proportion to their squares, showing that the size of a body augments its descending force with much greater rapidity than the resistances offered by its surfaces. If, lastly, it be supposed that all the fragments have the same volume and density, but are of various forms, it follows that those possessing the largest amount of surface will arrive at the bottom last, and the upper part of the deposit will consist of the thinnest pieces. It is evidently, then, of the greatest importance that the grains of ore which are to be concentrated by washing should be as nearly as possible of the same size, or otherwise the smaller surface of one fragment in proportion to its weight will, in a measure, compensate for the greater density of another, and thus cause it to assume a position in the series to which by its constitution it is not entitled.

This difficulty continually occurs in practice, and, in order to obviate it as much as possible, care is taken to separate, by the use of trommels and classifiers the coarse and fine grains which have nearly the same size into distinct parcels. In this way classification of the grains, according to their respective dimensions, may, to a certain extent, be effected, yet it is impossible by any mechanical contrivance to regulate their forms, inasmuch as these must in a great degree depend on the natural cleavage of the substances themselves; therefore, the result must always, to some extent, be affected by this circumstance. Each of the broken fragments of ore must necessarily belong to one of the three following classes:—

1.—MINERAL, without admixture of earthy matter, known as "prill," or solid ore.

2.—FRAGMENTS, made of a mixture of ore and earthy matter, called "dradge," or mixed stuff.

3.—MATTER, composed of vein-stuff, without an appreciable admixture of metallic ore, termed "castaways," or waste.

If the dressing is successful each of these three classes will have been separated from each other—the first will form the lower stratum; mixed fragments (2) will follow next in succession; and unproductive matter (3) will be deposited over the middle (2) layer. In connection with the foregoing remarks, some general deductions may be given:—

1.—Absolute perfection in separation of minerals according to their specific gravity cannot be obtained, chiefly on account of the irregularity of the various grains to be operated upon.

2.—The more finely divided the stuff to be treated the greater will be the amount of labour and care required, as well as imperfection in the separation.

3.—Successful reducing machinery will comminute the stuff to a sufficient size for effecting the liberation of the grains of ore, and for obtaining the largest proportion of waste and clean ore in the first operation.

4.—It is necessary in determining the degree of fineness to which a mineral should be reduced to consider the metallurgic or sale value of the ore contained in it, and to set against this item the value of the loss of ore which will be incurred in the enrichment, together with the attendant expense.

5.—That apparatus or plan of dressing may be considered the most efficient which with stuff of a given size allows at an equal cost of the most complete separation of the ore, and a distinct separation of particles of nearly equal densities.

The Specific Gravity of different Metals, Metallic Ores, and Minerals are given in the following Table:—

METALS.	Specific gravity.
Gold	19·25
Mercury	13·26
Lead	11·35
Silver	10·47
Copper	8·89
Iron	7·78
Tin	7·30
Zinc	7·00

METALLIC ORES, MINERALS, ETC.		Hardness.
Sulphide of lead	2·5—2·75	7·5 —7·6
Sulphate	2·3—2·7	6·25—6·29
Carbonate	3·0—3·5	6·46—6·48
Phosphate, green and brown	3·5—4·0	6·58—7·04
Chromate, bright red	2·5—3·0	6·00—6·04
Molybdate	2·7—3·0	6·70—6·8
Oxide of tin	6·0—7·0	6·5 —7·1
Tin pyrites	3·0—4·0	4·79—5·1
Sulphide of copper	2·5—3·0	5·5 —5·8
Oxide of copper	3·5—4·0	5·9 —6·0
Carbonate of copper	3·5—4·0	4·0 —4·1
Copper pyrites	3·5—4·0	4·15—4·16
Sulphate of copper	2·2	2·21
Silico carbonate	2·0—3·0	2·0 —2·2
Red oxide of zinc	4·3—4·5	5·43—5·52
Sulphide of zinc (blende)	3·5—4·0	4·02—4·07
Carbonate of zinc	5·0	3·3 —3·6
Sulphide of antimony	2·0	4·51—4·62
Jamesonite	2·0—2·5	5·5 —5·8
Wolfram	5·0—5·5	7·1 —7·4
Iron pyrites, white	6·0—6·5	4·67—4·84
Mundic	6·0—6·5	4·83—5·01
Sulphate of barytes	2·5—3·5	4·3 —4·8
Carbonate of barytes	3·0—3·75	4·29—4·3
Carbonate of iron	3·0—4·5	3·73—3·82
Fluor-spar	4·0	3·0 —3·33
Quartz	7·0	2·6 —2·7
Carbonate of lime	2·5—3·5	2·5 —3·8
Hornblende		2·8 —3·2
Syenite		2·7 —3·0
Trap		2·8 —3·2
Grauwacke		2·5 —2·9
Porphyry and felspar		2·3 —2·7
Granite		2·4 —2·7
Mica slate		2·6 —2·9
Clay-slate		2·6
Limestone and dolomite	2·5	—2·9
Sandstone	2·4	—2·7

WASHING-KILN.—Figs. 1 and 2 represent the elevation and plan of washing-kiln and sizing apparatus employed at Frongoch, one of the Lisburne mines, under the management of Messrs. Taylor and Sons. The kiln is a semi-elliptic structure of masonry, the bottom consisting of an inclined plane, paved at the upper part, and flanked with wood at the base near to the grate. A tramway is laid over the kiln, and extends to the forwarding level. Over this way the orey stuff is brought in wagons, and tipped into the kiln, where it is freed from clayed matter by water flowing from a launder and the application of the kiln rake. The dimensions of the kiln are as follows:—

Width at top from grate to back	9 ft. 0 in.
Top length at back wall	12 ft. 0 in.
Length at back of grate	4 ft. 0 in.
Depth at back wall	1 ft. 6 in.
Depth at grate	4 ft. 6 in.

The front wall of the kiln is 2 ft. thick, and is pierced with a rectangular opening, the bottom of which forms a line with the incline and washing grate. The grate is fixed on timber, 5 in. by 6 in., and 5 ft. long. The grate is 3 ft. 6 in. long, with bars 3 in. deep, the upper part of the bar being 1¼ in. wide, and the under side ¼ in. The space between the bars on the upper side is ⅜ in., and on the under side 1⅛ in. The "rough" picking-table surrounding the grate is 6½ ft. long, 8 ft. wide, and 2½ ft. high. The stuff and water which pass through the grate fall into a launder, 10 in. wide, and flow into a trommell, 5 ft. 3 in. long, and 1 ft. 6 in. diameter, making 40 revolutions per minute, with an inclination of 4 in. in its length. The rotary picking-table is 10 ft. diameter, and 22 in. high from the ground. One revolution is performed in four minutes, or rate of speed (say) 1½ in. per second. The hands required are—a young man, to grate and distribute the stuff; four strong girls—two on each side of the "rough" table, to pick and select the stuff; and four small girls at the rotating picking-table. Men are employed to tram away the

waste, the quantity of which varies with the richness of the stuff waggoned into the kilns.

The mineral at the washing-grate and rough picking-table is divided into waste, best, and seconds ore. The first is thrown away, the second is a merchantable product, the dradge work is sent to the crushing-mill for reduction, and for subsequent enrichment. The stuff passed to the rotative table is picked for best ore, crusher, and jigger work; the stuff falling from the meshwork of the trommel is jigged into waste for the attle-heap, and into rich and second-class raggings. The apparatus, therefore, embraces two direct mechanical sub-divisions of the stuff—one at the washing-grate, the second through the single dividing trommel.

Meetings of Mining Companies.

EAST WHEAL LOVELL MINING COMPANY.

At the meeting of adventurers, on Wednesday, at the Star Hotel, Helston (Mr. HENRY ROGERS, the purser, presiding), there were present Colonel Percival, Messrs. W. West, T. H. Edwards, Sargent, Quentrall, Toy, Nancarrow, Oke, Sleeman, Ellis, Martin, Crotch, Newport, Cudlip, Lean, and others.

The CHAIRMAN congratulated the shareholders upon their again meeting under such favourable auspices. Including the dividend paid on Oct. 1, 1869, and that which would be declared that day, they had actually divided a profit of 20,000*l.* out of a return of tin of 26,000*l.* He thought, therefore, they would agree that East Lovell had not been excelled in the county. The accounts showed a credit balance at the last meeting of 4271*l.* 14s. 5d. They had since sold tin to the weight of 71 tons 7 cwts. 3 qrs. 7 lbs., which at an average of 75*l.* 7s. 6d. had produced 5373*l.* 9s. 10d. The carriage of tin amounted to 44*l.*, which made a total credit of 9689*l.* 4s. 3d. They had paid at the last meeting a dividend of 2*l.* per share—3812*l.* The three months' labour cost was 820*l.* 9s. 6d.; merchants' bills, 289*l.* 15s. 9d.; and the dues—he questioned whether ever before the dues of any mine had exceeded the merchants' bills—293*l.* 14s. 4d. This left an available balance of 4473*l.* 4s. 8d. Deducting from that the dividend of 2*l.* per share which they proposed to declare (3812*l.*) there would be a credit balance left of 661*l.* 6s. 8d., or an increase of 201*l.* 10s. 3d. (Hear, hear.) As Capt. Quentrall would tell them, the meeting had been deferred solely on account of the dryness of the season. They had never wanted any tin, and the principal reserves in the mine stood just as at the previous meeting. Since that date he might observe that the mine had been transferred twice over. He would just allude to the various reports which had been circulated respecting the concern. Capt. Quentrall had reported that a slide, or more correctly a bar, of poor ground had made its appearance in the 80, on the north lode, and a great deal had been made of it. The adventurers would recollect that a slide came in also when they were sinking the rich winze below the 70, which had the effect of shortening the tin ground naturally towards the shaft. They found that a little while after the slide turned round to the west again, when the tin ground made under. They had a similar slide then. It came in about two months since, and for the time took a dip east 3 or 4 ft. in a fathom; but during the last week or two it had taken an almost perpendicular direction. Although it might suit the purpose of "bears" to say that the tin ground in the mine was ruined, those who knew a little about the mine thought it might be one of those things that had happened before, and might rather improve the value of the tin ground than otherwise. (Hear.) It so happened that they had more than one bunch of tin, and they were inclined to think that the slide might be a kind of separation between the two rich courses of tin ground which they had east and west. Some gentleman had been kind enough to suggest that an extra month's cost should be charged. Well, with the permission of the shareholders, he would do it. The labour cost was 287*l.* 6d., and the merchants' bills 50*l.* 7s. 6d. Nay, he would go further, and propose that they should pay another 90*l.* for the whim-engine which had just been erected, and after all that they would still have a balance of 233*l.* 11s. 2d.

Mr. EDWARDS and Mr. WEST, who moved and seconded the adoption of the accounts and the declaration of the dividend, thoroughly approved of this being done, and it was unanimously decided accordingly.

The agents' report was then read, as follows, Capt. QUENTRALL explaining that all the tinstuff brought from the south level lay on the mine untouched, and Mr. WEST remarking that the western sett was a capital mine in itself. Capts. Quentrall and Peters say:—

"We have sunk the western shaft, which is 200 fms. west of the north lode, since last meeting to the 20, and have commenced sinking below in a lode worth 20*l.* per fathom. We have driven the 20 fm. level 5 fms. east; lode in the present end yielding rich stones of tin; and west 6 fms., through a lode 2 ft. wide, producing good stamping work.—South Lode: We have communicated the winze below the 60 with the 70 west. This has laid open a valuable piece of tin ground, and we are stoping the back of the 70 in a lode worth 50*l.* per fathom. In the bottom of this level the lode is worth 90*l.* per fathom, and we have commenced driving the 80 west by six men towards the run of tin ground, which we expect to reach in about 5 fms.—North Lode: We have completed the skip-road to the 80, and sunk 5½ fms. below where the rich course of tin has been shortened by poor ground from the westward, which dipped east 4 ft. per fathom for the first 3 fms., but is now taking almost a perpendicular direction, and the lode towards it is resuming its former rich character. We believe the tin ground will now again take its usual dip westward. Our present bottom, for 12 ft. long, is worth 200*l.* per fathom. The eastern end is worth 300*l.* per fathom, and is now about 5 fms. from the rich ground, which has been so often valued at from 800*l.* to 1000*l.* per fathom. The steam-whim engine is nearly completed, and we shall commence to draw with it next week. This will greatly facilitate the more vigorous development of the mine. The want of drawing power, and the excessive dryness of the season, preventing us from stamping our tinstuff, has been the sole cause of delaying the meeting. We have commenced operations in the Tregonebris portion of the sett, which we consider likely to become a valuable part of the mine. Our prospects are most encouraging, and will, we think, improve."

The CHAIRMAN, in commenting upon the report, said he was very sorry that the gentlemen who had sent forth the false reports which they had heard concerning the mine were not present. Actually one person, who had endeavoured to make out the concern to be valueless, was one of the inspectors who reported so favourably at the previous meeting; and in private letters written to him (Mr. Rogers) since, unsolicited, had said how well it was looking for permanency. Another report which had just reached him from London was that he was stated in Broad-street to have reduced his interest to two shares. The register would show that he held between two and three hundred. He had not parted with his interest in the concern, nor had he the intention of doing so. He was very sorry that some gentlemen had been induced to part with their shares at 22*l.* to 23*l.* each. However, he had given his broker in London discretionary orders to buy shares if the "bears" knocked them down to a certain price, and he did not believe if other gentlemen did the same they would have any reason to regret it.

This concluded the business of the meeting, and the company then adjourned to dinner, also under Mr. ROGERS's presidency. In giving the toast of "The Duke of Cornwall," he remarked that Mr. West and himself paid the Duchy more dues than all the other Duchy mines in Cornwall put together.

"Success to East Lovell" was, of course, the toast of the day. In proposing it, the CHAIRMAN remarked that whatever happened in the future they, at all events, had a most valuable mine. Perhaps that time twelve months they might be in a different position. It was not for him to say they would not, but from what Capt. Quentrall (in whom he placed implicit reliance) told him he would venture to say that East Wheal Lovell was not done yet; and he hoped to pay the shareholders an equally good, if not a better, dividend for a long time to come. They had a mine which was of a most economical character in working, as the small amount of the merchants' bills would show. In fact, this cost was so low that 20*l.* to 30*l.* a fathom would enable them to make a profit. Personally, his opinion of the mine was such that he trusted the "bears" would continue their operations.

The toast of "Neighbouring Mines," being extended to include the county, was coupled with an allusion to Wheal Phœnix, and the name of the gentleman to whom the extraordinary success of that undertaking is due—Mr. WEST—who briefly replied. He observed that, in his opinion, mining in Wendron was in its infancy, and that he was thoroughly satisfied with the position and prospects of East Wheal Lovell. As to Phœnix, the former manager had said there was not tin enough in the mine to keep four heads of stamps going. Now, he had 140, and intended to put up another 100.

Capts. QUENTRALL and PETERS, in responding to the toasts of their healths, expressed the fullest confidence in the mine as looking more permanent than ever. Capt. Quentrall observed that Mr. West had more stamps, but that Lovell would return more tin per head, and stated that he had not sold a share, and did not intend to.

The next toast was "The health of the Chairman," proposed in highly eulogistic terms as that of a man in whose ability and integrity everyone had the highest confidence, by Mr. EDWARDS.—In replying, Mr. ROGERS remarked that during the 13 years the mine had been on foot he had never heard anything adverse either to his integrity or his judgment, and he could challenge the strictest investigation into everything with which he was connected. His opinion of the mine was shown by his actions. He might have realised 10,000*l.* more than once during the past year, but had abstained, and should abstain; and if anyone had 50 shares to sell at (say), 20*l.*, ex div., he would buy them, but he hoped gentlemen had more confidence.

For "The visitors," Mr. SARGENT, of Liskeard, responded.—*West. Morn. News.*

EUREKA GOLD MINING COMPANY (GRASS VALLEY, NEVADA COUNTY, CALIFORNIA).

The annual general meeting of stockholders was held in San Francisco, at which Mr. L. S. ADAMS (the President) occupied the chair.

The PRESIDENT reported that the fiscal year, ending Sept. 30, had been by far the most profitable of any of the company's existence. The gross yield of bullion had been $662,000, and the average yield per ton $31·75. The monthly yield had been $54,600, the expenses $18,400, and the profits $36,200, equal to $9 per share per month. The cost of milling and mining per ton was $10·16. During the year $40,000 had been paid in dividends, being $136,000 more than was paid the previous year. The ore (including sulphurets) had paid $31·75 per ton, against $27·80 the previous year. The increased cost of milling and mining arises from the fact that the dead work in connection with the opening of the sixth level, although not properly belonging to this year, had all been added. There had been paid 53 consecutive dividends in 51 months, amounting to $1,334,000, which best prove the extraordinary yield and regularity of the Eureka lode, and which, on the whole, notwithstanding the large results already obtained, never looked more promising for the future.

Mr. WILLIAM WATT (the superintendent) reported that provided the resources of the fifth level are as good as those of the fourth, they may reasonably expect 27,000 tons of quartz more from the fifth level and above, or over one year's work for the mill. Nothing had been drawn from the sixth level as yet, and therefore, he could safely say they had three years' work in sight for the mill, at the present rate, without sinking. Mr. Watt regards the future of the Eureka Mine as very promising, more especially as the sixth level shows a decided improvement over the fifth, and the ledge in bottom of the shaft is looking well.

[For remainder of Meetings see to-day's Journal.]

FOREIGN MINING AND METALLURGY.

It is reported from Liége that the plant and locomotive workshops of that province have received some important orders. We are not in a position to confirm the accuracy of this statement, however. It is high time that the Belgian metallurgical interest should receive some fresh orders; on all sides complaints are made, and appear to be increasing in intensity. The Charleroi Association of Forgemasters has just, through the medium of its President, M. Smitz, addressed to the Belgian Minister of Public Works a letter in which the precarious state of Belgian metallurgy is represented to the Minister. The letter states that the exhaustion of the mineral bearings of Belgium obliges Belgian metallurgists to seek at least one-fourth of their consumption abroad, and the forgemasters complain that this unfavourable state of affairs is aggravated by the insufficiency of means of transport, and also by the high rates exacted for the conveyance of minerals.

The interruption of the negociations with reference to an armistice, and the apparent certainty of a long and bitter struggle being in store for France and Prussia, have shattered hopes which had been conceived with reference to the Belgian coal trade. The coal trade is more cruelly affected than any other by the state of affairs, as while other industries can seek customers elsewhere, colliery proprietors cannot with the same readiness find clients. New customers which appeared in Belgium in the first stage of the war appear, indeed, to be falling away; working operations having been resumed in the basin of the Ruhr, Holland is again neglecting Belgium, and begins to supply her wants in the Ruhr basin. Nevertheless, Belgium has concluded a large contract with one of the most important houses of the Low Countries, and a certain number of orders have arrived recently from that kingdom. The winter season is also expected to increase the demand for domestic qualities of coal. In the Charleroi basin a good number of colliery proprietors have resumed their ordinary working operations. It is not the same with the basin of the Couchant de Mons, where the state of affairs obliges coal owners to reduce their extraction. In this latter basin prices of coal are very variable.

Affairs in copper upon the French markets have been reduced to very narrow limits. At Marseilles, Toka has been quoted at 76*l.*; Spanish, 68*l.*; and Chilian and refined Peruvian, 76*l.* per ton. The state of the German copper markets shows some little improvement. At the same time transactions have not presented much importance, by reason of the extremely unsettled state of affairs. In Holland prices have not changed. As regards tin, it may be observed that Banca has been quoted at Marseilles at 152*l.*, and English at 144*l.* per ton. At Rotterdam the market for tin has presented little change; Banca was held at 73 fls., and Billiton at 72 fls. Lead in saumons, first fusion, has brought 18*l.* 4s. per ton; ditto, second fusion, 17*l.* per ton; ditto, in shot, 20*l.*; ditto, rolled and in pipes, 20*l.* 16s. per ton. At Rotterdam, Stolberg and Eschweiler have made 11 fls.: and German lead of various marks, 10¾ fls. At Marseilles, rolled zinc has made 28*l.* per ton. At Breslau the zinc trade continues very quiet; consumers are amply supplied, and affairs have been, upon the whole, in a languishing state.

The shareholders in the Hoerde Mining and Metallurgical Company have just held their nineteenth ordinary general meeting. The profits of the year are returned at 409,300 thalers, after 187,652 thalers had been carried to the sinking fund account. Out of the profit of 409,300 thalers, 145,292 were applied to the interest and redemption of the company's loans and to the reserve fund. The remaining balance of 264,007 thalers admitted of the distribution of a dividend at the rate of 8 per cent. per annum, leaving a trifling balance of 7 thalers to be carried forward to a new account. The metallurgical production of the company seems to have increased last year to the extent of about 10 per cent., as compared with the preceding 12 months. The shareholders in the Potschaffel Colliery Company have also had a meeting. In the year ending June 30, 1870, only one of the company's mines, the Windberg, was worked; it yielded 225,565 tons of coal, showing an increase of 57,367 tons, as compared with the preceding 12 months. The production of coke by the company last year was 18,028 tons. The rough profits realised for the year were 12,555 thalers, but after allowing for sundry expenses of management, &c., the balance remaining of this sum was only 262 thalers. A report of the Neu Schottland Mining and Metallurgical Company states that in the first few months of the current exercise the general appeal made to the army in Germany diminished the company's staff of workmen, and by consequence reduced the production. Notwithstanding the war, the manufacture of iron in bars has remained active. On the other hand, the demand for rails has greatly fallen off. The company being in possession, however, of considerable foreign orders received before the war, the production of rails can be carried on by it for some time without reduction. After providing for all expenses, the net profits realised by the company in 1869-70 amounted to 249,545 thalers, admitting of a dividend at the rate of 8 per cent. per annum, while a considerable sum was carried to the reserve fund. The Fredrick Wilhelmshutte Mining Company, at Mulheim-sur-Ruhr, divides at the rate of 2½ per cent. per annum for 1869-70.

EBERHARDT AND AURORA SILVER MINING COMPANY.

For important reasons known to those associated with this extensive undertaking, detailed information respecting the progress of these mines has been withheld from publication. As, however, much interest is evinced in the future of this great property, which brought the White Pine district into its present celebrity, it may not now be inopportune to publish such particulars as can be collected.

According to the authority of a journal published in the district, it appears that at Eberhardt an additional vein of exceedingly rich chloride of silver has recently been discovered, which will assay very high. The seam is pretty wide, and showing plenty of ore. The large chamber, which has long been famous for the great amount of horn silver it produced, may still be regarded as famous, for horn silver, chlorides, &c., are being taken out as usual. The average yield of the ore from the Eberhardt Mine at the present time is $100 per ton, and is being hauled and worked at the Oasis mill, at Shermantown, also the property of this company. Mr. Atwood, the superintendent, porposes to put the mine in such a condition that, as soon as the new mill, now building at Eberhardt city, was sufficiently advanced to warrant it, he will be able to put on an additional force of miners, and take out some of the vast quantities of silver ore now in sight. A wire tramway is about to be built in Eberhardt, commencing at the North Aurora Mine. Relative to the latter mine, also the property of the Eberhardt Company, it is mentioned that it is at present being worked under a contract, and is returning some very good ore.

The mill at Eberhardt city is intended to be the most complete in all its details that has ever been erected, if money and practical knowledge, gained by long experience and study, can make it so. The walls are built of stone 2½ ft. thick, and the main building will be 127 feet long, and 122 feet wide, and connected with the assay and melting office by a car track from the amalgamating room. The machinery was built by Messrs. Booth and Co., San Francisco, and it is stated by the California papers that upon trial the engines were found to be not only the most complete, but the best working engines ever built on the Pacific Coast. There are two engines, 18 by 42 and 20 by 42 respectively; four boilers, 56 by 16 each; one donkey engine and a complete machine shop. The battery consists of 60 stamps, half of which will be for dry crushing and the balance for wet. The drying-floor, back of the battery, will be 50 feet long. In the ore-house will be one of the largest sized rock-breakers, discharging into a novel arrangement in front of the batteries for feeding; it will be a kind of automaton feeding concern, obviating the use of men for battery feeders. The amalgamating room will contain 22 very large pans, 11 settlers and three agitators; with the latter is connected a patent elevator, which will take the quicksilver from the agitators back to the pans without being handled, thus not only saving labour, but also waste. The assay office will contain four retorts, the amalgam being brought from the mill by car in front of the retorts. The melting furnaces will be alongside of the retorts. The next rooms contain the small furnaces for fire assays, while a separate room is set apart for wet assays, and another for a small laboratory; still another room will contain the small and delicate assay balances, while the heavy bullion scales will be kept in the general office; connected with the building will be a large fire-proof vault. The building of the mill is under the personal supervision of H. W. Bordwell, and to judge from present appearances and plans he will have reason to be proud of his work. Water will be brought in pipes from Shermantown, and a large stone tank is being built for a receiver back of the mill. The company owns the well-known Applegarth springs. The mill site contains 160 acres of land, and there will be ample room for all necessary buildings, wood and other stores. The timber is coming from Truckee, and is all fitted and morticed, so that it will not only save freight, but expedite the putting up. Mr. Atwood states that this masterpiece of mechanical skill will be in working order by the commencement of December.

FOREIGN MINES.

ST. JOHN DEL REY.—The directors have received the following report, dated Morro Velho, Oct. 17:—Morro Velho produce for September, 9984 oitavas, from 3978 tons ore, yield 2·509 oitavas per ton. Morro Velho cost for September, 4096*l.*; loss for ditto, 240*l.* Morro Velho produce, eight days of October, 2372 oitavas, yield 2·359 oitavas per ton. Remittance received 20,276 oitavas, equals 194 8-10ths lbs. troy.

DON PEDRO.—Mr. F. S. Symons reports for September:—Produce, 5364 oits., at 8s. 6d. per oit., 2279*l.*; cost, 2568*l.*; loss, 289*l.* The auriferous quality of lode excavated has not equalled that for August. Sinking has progressed. Explorations on lodes at Alice's West vigorously prosecuted, as well as at Matodas Cobras. Jacotinga gold has been seen in samples washed from Corrego; this is very promising. Of the permanent pumping machinery a large portion has already left Rio, and I hope to get the greater part at Barbacena before the roads get bad from wet weather.

ANGLO-BRAZILIAN.—Mr. F. S. Symons reports for September:—Produce for the month amounts to 2821 oitavas. The produce, I am much pleased to report, exceeds that for August (with one working day less) by 280 oits. The appearance of the mine has improved.—October 19: Operations proceeding with regularity. The lodes at Haymen's and Dawson's are most promising in size and appearance. Nothing new to advise at the other sections.

ROSSA GRANDE.—Mr. Ernest Hilcke, reports for September: The gold returns for the month amount to 2012 oits., derived from 96 tons of ore; yield, 21 oits. per ton.—Mina de Serra: The driving of the 40 west has been resumed, and a lode of promising appearance has been intersected here since. We also met with an improvement in the size of the lode in the stopes above the 40 and below the 50. On the whole, I am pleased to say this mine is looking more favourable that it has done for some time back. The supply of stone during the month has been obtained from the western part only, and has yielded 21 oitavas per ton, a most promising and satisfactory result.—October 16: The auriferous quality of the stone at Mina de Serra continues to be very good, though the lode is not quite so large as when last reported on. All the other sections are without noteworthy alterations.

GENERAL BRAZILIAN.—Capt. Thos. Treloar reports for September: We are not yet extracting gold, nor attempting to do so. This may not be very acceptable news, but it must be borne in mind that we are yet in our first year, that the mines are extensive, force still inadequate to our requirements, and that had part of the latter been devoted to extracting gold instead of upon works for future advantages of the company, the early gain would be far outweighed by after loss. It is never truly advantageous to extract produce before a mine is properly opened. When the old adit at St. Anna and the shallow adits at Itabira reach the auriferous jacotinga formation (and the first I hope will do so in the early and the last in the latter part of next year) we shall have gold, but the main object of these adits is to take up all surface water at their horizons. From two places already discovered by our explorations (*vide* report for May) we shall also have produce, but the mines will not reach high mark before the great shoots of gold worked upon by the former owners are drained and mines upon the same fully opened.—October 16: Everything continues to progress satisfactorily, except at the shallow adit at St. Anna. At this place the ground continues very troublesome, and the progress consequently very slow. We shall eventually overcome all difficulties; but, being told on all sides that the great riches of St. Anna lie only about 100 fathoms before us, the trouble occasioned by the flookan is very vexatious.

TAQUARIL.—Mr. T. S. Treloar reports for Sept. that 62 ozs. 8 dwts. troy of gold have been derived this month from 6¼ tons of stuff roughly treated at the sampling-room. This return, though unequal to what we had from the shoot found in old stopes west of shaft, is in the highest degree satisfactory, inasmuch as the matter which yielded the above gold represented a large percentage of the ordinary lode unavoidably quarried in consequence of the contracted size of our workings. The main shoots thus far met with in both lodes are at present below water level, and until this section of the mine is drained by Haymen's shaft, and we commence stoping operations, but little gold can be taken from them. Fifteen tons of auriferous stone have been quarried, chiefly from the under lode, of which, as already mentioned, 6¼ tons have been treated, the remainder has been stocked for the stamps. In Haymen's shaft the bar of sandstone between the two lodes was struck on the 8th inst., since when but poor progress has been made in sinking, the ground being hard and wet. At the deep adit good duty has been done. A cross-cut, evidently driven from old adit to the lode for explorations, was holed into on the 20th, but owing to existence of foul air therein a cursory examination only has to date been made. This communication between the two adits will be cleaned out for ventilation, and in due course the lode at point of intersection will be fairly tested. The branch level from Rouse's has advanced 12 fms. 2 ft. The exploratory cross-cuts continue under suspension.

Under date Oct. 15 Mr. T. S. Treloar writes that the operations generally are progressing in a highly satisfactory manner. Weather being very favourable and the gudgeons having arrived on the 5th inst., all works relating to the stamps are now advancing apace. Our best efforts are being put forward, and the utmost will be done to begin stamping about the middle part of next month. But little gold has been derived since the end of last month from shoots of which mention has hitherto been made. As already advised, they are below water level, and access to them is difficult owing to the contracted size of our workings; and until Haymen's shaft drains this section of the mine, and stoping operations are commenced, works upon them must remain in abeyance. Another shoot was met with the day before yesterday, and from it we have already taken out over 30 ozs. troy of gold, besides some rich nuggets, which I retain in their natural state for transmssion to the directors. This vein is contained in an extensive bed of black oxide of manganese lying upon the top lode, and in nature differs widely from everything yet reported. It varies in width from 3 to 6 in., and is 2¼ ft. in length, is soft and easily extracted, and produces bunches of box work superior even to the rich shoot in under lode. More veins of this kind will, no doubt, be found in the same body of manganese. In Haymen's shaft poor progress has been made in sinking during the past fortnight, owing to extremely hard and troublesome ground; we have however, every indication that the lode is near, and I expect to be able to advise by next mail the intersection of the same, and the drainage of the old shaft. The cross-cut holed at the deep adit is being cleared out. On the 8th inst. I forwarded to the Don Pedro establishment, for transmission to Messrs. John Moore and Co., a box containing 67 ozs. troy of gold. The next remittance, I hope, will be gratifying to all.

BRAGANZA.—Sept. 30: Itabira do Campo: The deep adit has been driven this month 4 fms. 2 ft. 6 in.—No. 1 Lode: This week I have put the men to cut into the footwall part, and I am pleased to say this lode is 2 feet wide, a well-defined masterly quartz lode. The gold is very fine, and all the stuff will have to go to the stamps.—B Cross-Cut: Here also lode No. 1 has been cut, but not yet through it—apparently a good-sized lode; samples show gold. We are progressing rapidly with another and a larger water-wheel, and shall commence to lay down the same immediately. The staff are in good health, and all the works are going on steadily.

CHONTALES.—John Tonkin, Nov. 6: Herewith I beg to hand you my report of the San Antonio Mine for the month of September. The No. 1 stope in back of the No. 6 level, west of the No. 2 rise, has been stoped 67 varas; lode 3½ ft. wide, worth 5 dwts. of gold per ton. The No. 2 stope, in back of the same level, west of No. 2 rise, has been stoped 44¾ varas; lode 3½ ft. wide, worth 10 dwts. of gold per ton. A stope in back of the connection level has been stoped 79 varas; lode 4 ft. wide, worth 5 dwts. of gold per ton. The connection level has been driven east on the course of the lode 7 varas; the lode is 3 ft. wide, worth about 5 dwts. of gold per ton. I expect this level to improve daily. We have cut the lode in the new cross-cut east, and driven 8¾ varas west on the course of the same, which is 3 ft. wide, showing a little gold, but not sufficient to value. The Santo Domingo deep cross-cut has been driven 2¾ varas; the ground is very hard and slow for driving. We have had three men working at night for the last three months re-timbering and putting in a new tramway in the No. 6 level, which is now completed west of the stopes. The Nos. 1 and 2 stopes, in back of this level, are looking well, and I think good results may be expected from the same. The mine, together with tramways, are now in good working order. Quartz sent to the stamps for the past month amount to 954 tons, which I estimate at 6½ dwts. per ton; in all, 304 ozs. of melted gold.

CUIABA (Gold).—The directors have received advices under date Oct. 12.—Vivian's Level: Excepting that on the 6th inst., when we cut a line of auriferous quartz, a feeder of the main lode, we have not yet encountered any hard rock in this level. The daily average quantity of stuff ejected is 24 tons, and the distance excavated to date 67½ fathoms. The remainder of our force is now engaged in cleansing out and repairing the high level water-course; three places have been secured with planking and candea poles, and 50 feet of launders renewed.

I enclose a short report, made on Sept. 27 by Capt. Hosken, the head mining captain of the Rosa Grande Mining Company:—"The level or adit, called Vivian's level, which is in course of driving to intersect the Fonte Grande lode, is, in my opinion, in its right direction, and the work already accomplished with its tramway, and sets of timbering of the best possible kind; the ground is most favourable for excavating, and I believe that after the advance of a few more fathoms the first lode itself will be reached. I have visited high up the Cuiaba Mountain an opening upon the body of one of the side lodes, where during my presence a hole was blasted in the rock, exposing a fine auriferous lode interspersed with specimens of rough gold. Basing my opinion upan this and other superficial openings upon the Cuiaba lodes visited by me to-day, I have no hesitation in stating that from the several lodes situated upon thes property and their extraordinary sizes and quality, the Cuiaba Gold Mining Company has one of the best mineral properties in Brazil.

EXCHEQUER (Silver).—L. Chalmers, Oct. 18: The air-shaft was raised 8 feet last week. The north drift from the 80 was run in 7 feet. A car load, or 1750 lbs., of ore was taken from the lower level in the course of running the drift; the ledge here narrowed somewhat, but is now increasing in width and shows ruby ore. The bullion and assay furnaces will be finished to-morrow, except the tops, which I must get from San Francisco.

ECLIPSE (Gold).—Capt. Barratt, Oct. 15: We have put the whim to work, and the clearing of main shaft and fixing of incline in the same are being done with as much dispatch as possible. The boiler-makers are progressing as fast as possible with the boiler. The engineer is also busy fixing the engine, &c. Some dwelling-houses have been built, and a store-room is now in course of erection at the mill. All the necessary erections and preliminary works are being executed for the future working of the mine.

JAVALI.—The directors have received news from Dr. Seemann, the managing director, to Oct. 9. Ten stamps and two pans produced, by grinding 529 tons of ore, 288¼ ozs. of gold, or, say, 11 pennyweights per ton. The quality of the gold greatly improved by the use of sodium. Health excellent, and labour abundant. Current expenses reduced to 400*l.*

LUSITANIAN.—Report for November: In sinking Taylor's engine shaft below the 140 the lode in the shaft is worth 2½ tons per fathom. In cutting the top plat in the 140, east of Taylor's, the lode is 2 ft. wide, composed of flookan and schisto. In the 140 west the lode is worth ¼ ton of ore per fathom. In the 130 west the lode is composed of quartz and stones of ore. In the 130 east the lode is 1½ ft. wide, composed of flookan and schisto. In the 120 east the lode is 2 ft. wide, composed of schisto. In the 110, east of River shaft, the lode is 6 ft. wide, composed of quartz and stones of ore. In the 90 the lode is 3½ ft. wide, composed of quartz and stones of ore. In the adit level, west of Peree shaft, the lode is worth ¼ ton of good ore per fathom. In the 8, west of Peree shaft, the lode is 6 in. wide, composed of country. In the 8, east of cross-cut the lode is poor. In the 18, on the branch, the lode is 1 foot wide, composed of quartz. In the 28, on Mill lode, the lode is 1 ft. wide, composed of flookan, with stones of ore. In the 38, east of Taylor's, the lode is 1¼ ft. wide, worth ¾ ton of ore per fathom. In the 38, west of slide lode, the lode appears to be in small strings as we are leaving the slide. In sinking No. 82 winze below the 70, east of River shaft, the lode is 2 ft. wide, composed of quartz and stones of ore. In the rise above the 90, east of River shaft, the lode is 6 feet wide, composed of country and quartz. In No. 84 winze the lode is worth ¼ ton ore per fathom.—Carvalhal: In the 60 cross-cut, south of incline shaft, the ground consists of hard gneiss. In No. 11 winze, below the 20, west of incline shaft, on the caunter lode, the lode is 1½ ft. wide, worth ¼ ton of lead per fathom. In the 50, east of incline shaft, on great lode, the lode is 1½ ft. wide, worth 1 ton of blende per fathom. In the 50, west of incline shaft, the lode yields stones of mundic. In the 40 east the lode is 2 ft. wide, composed of quartz. The lode in the 20 east is 1½ ft. wide, composed of quartz and mundic. In the adit, west of incline shaft, the lode is 9 in. wide, spotted with blende and lead. In sinking No. 12 winze below the deep adit the lode is 2 ft. wide, composed of quartz, spotted with lead, copper, and mundic.

[For remainder of Foreign Mines see to-day's Journal.]

From Chili we learn that the war in Europe has had a very unfavourable effect upon all kinds of business. The price of copper would not, it was said, cover the cost of production, except under very exceptional circumstances; and a large number of mines will have to suspend operations, unless an improvement takes place in the English market.

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